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as a whole around a northwest-southeast line. There are a great many local irregularities in the observed velocities. The actual motions of the nebulous masses may be of a somewhat local nature.

In particular, we have found that the velocities within 10" of the brightest Trapezium star, Bond No. 628, are 4 or 5 km. greater, recession, than are the velocities in the bright region lying just west of the Trapezium group. It is upon the latter region that most observers have ordinarily placed the slits of their spectrographs.

The detached nebulous mass 7' north and 4' east of the Trapezium is receding from our position in space about 8 km./sec. with reference to the general Trapezium region.

Other detailed results are reserved for a more extensive publication.

The desirability of confirming the interferometer data appealed also to Director Frost of the Yerkes Observatory. The observations secured by Frost and Maney with a 1-prism spectrograph, in January-March, 1915, and already published, are likewise in general confirmation of the Marseilles results.

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A STUDY OF ABSORPTION EFFECTS IN THE SPIRAL NEBULAE.
(ABSTRACT)

It has long been a matter of common knowledge that certain spiral nebulae seen edgewise show a dark lane running down the length of the spiral, generally explained as due to a band of absorbing or occulting matter. The Crossley photographs at present include several hundred spirals, and show that this phenomenon is a very common one. Over sixty spirals give evidence bearing on this characteristic; many of these were shown in lantern slides at the Stanford Meeting of the Pacific Division of the A. A. A. S.; the illustrations will be published in the near future.

A first group of data is formed by the edgewise spirals which give unmistakable evidence of an absorbing lane. The following are the N. G. C. numbers of edgewise spirals showing this phenomenon:

169, 678, 891, 2146, 2968, 3556, 3628, 3718, 4013, 4244, 4282, 4388, 4402, 4517, 4526, 4565, 4594, 4631, 5746, 5866, 5907, 7814.

Considering the proportion of spirals which may be expected

to present themselves almost exactly edgewise to us, it will be evident that the percentage showing absorption lanes is a large one.

A parallel line of evidence is furnished by a large proportion of the considerably elongated spirals whose planes make a slight but appreciable angle with our line of sight. Any asymmetry due solely to irregularities of form should, in a large number of cases, give asymmetrical effects oriented at random with regard to the nucleus. This is not found to be the case. Where elongated spirals show asymmetry this is invariably along the minor axis of the projected ellipse and roughly parallel to the major axis. This asymmetry shows frequently in "lanes" prominent on one side of the major axis and invisible on the other, in an apparent displacement of the nucleus along the minor axis, in much greater brightness of the nebular material on one side of the major axis, or in various combinations of these effects. Among the elongated spirals showing these effects are:

N. G. C. 224, 697, 972, 2683, 2841, 2903, 3031, 3034, 3079, 3169, 3368, 3389, 3404, 3623, 3675, 4020, 4192, 4206, 4212, 4216, 4220, 4258, 4266, 4274, 4429, 4527, 4536, 4666, 4826, 5005, 5014, 5033, 5055, 7184, 7537, 7331, 7817, I 1029, and II 2487.

It is possible that this absorption is due to the same general cause as the "dark nebulae" photographed by Barnard, the occulting matter seen around diffuse nebulosities (N. G. C. II 5146 is a striking example), the dark "holes" and rifts seen in such diffuse nebulosities as *Messier* 8, or in the stationary calcium lines of certain spectroscopic binaries.

A good deal of evidence is being gathered as to the existence of occulting matter in our galaxy, and one explanation of the peculiar grouping of the spirals about the galactic poles assumes the presence of such occulting matter in our galactic plane, cutting off from our view all spirals in these directions. In that rings or whorls of occulting material are shown to be a very common characteristic of the structure of the spirals, the results of this investigation may be considered as having a definite bearing on the probability of such a hypothesis.

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